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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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29858	7590	10/28/2005	EXAMINER	
BROWN, RAYSMAN, MILLSTEIN, FELDER & STEINER LLP 900 THIRD AVENUE NEW YORK, NY 10022			GOLDEN, JAMES R	
			ART UNIT	PAPER NUMBER
			2187	
DATE MAILED: 10/28/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/681,386	PRAHLAD ET AL.	
	Examiner	Art Unit	
	James Golden	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 October 2003.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-17 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-17 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 07 October 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05/10/04, 11/02/04</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The instant application 10/681386 has a total of 17 claims pending. There are 6 independent claims and 11 dependent claims. Claims 1-17 have been rejected in view of prior art.

Information Disclosure Statement

1. The information disclosure statements submitted on 05/10/2004 and 10/29/2004 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters 800, 802, 804, 806, 808, 810 and 812 each have been used to designate two distinct operations in Figs. 8 and 9.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The title "Snapshot Storage and Management System with Indexing and User Interface" is suggested.
5. The disclosure is objected to because of the following informalities: the comma following application should be removed [00033, line 6]; "employ or measure" may perhaps be corrected to --employ measures-- [00045, line 9] or something similar; "folder" should be correct to --folders-- [00059, line 1]; "708" should be placed outside of quotes, [00068, line 10]; "bases" should be corrected to --basis-- [00070, line 1]; "Fig. 9" should be corrected to --Fig. 10-- [00080, line 1]; "Figs. 8 and 9" should be corrected to --Figs. 9 and 10-- [00084, line 1]; "905" should be corrected to --906-- [00086, line 4]; "Fifth" should be amended to --Fifth (n - 1)-- [00087, line 9]; "Sixth" should be amended to --Sixth (n)-- [00088, line 2]; "DR" should be expanded to that for what it stands [00092, line 3]. Appropriate correction is required.

Claim Objections

6. Claim 8 is objected to because of the following informalities: "select" should be corrected to --selected-- (line 2). Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. **Claims 1-4, 7-8, 10 and 14-17** are rejected under 35 U.S.C. 102(e) as being anticipated by Welsh et al. (US 2004/0117572).

9. **With respect to claim 1** Welsh et al. disclose a method of managing stored data in a storage management system,

- the storage management system (Fig. 2) including
 - a storage manager (220 of Fig. 2) [0052, lines 2-5] [0053, lines 10-end],
 - a media agent (212 of Fig. 2) [0053, lines 1-2] connected to the storage manager (connection between 212 and 220 of Fig. 2), and
 - a primary volume (242 of Fig. 2) [0052, lines 4-end] connected to the media agent (indirect connection from 242 through 220 to 212),

- the method comprising [0055-0077]:
 - taking a snapshot of the primary volume (at times 5-10 of Fig. 3) [0062, lines 3-6, where "Volume Granules" denote primary volume storage (see 0059) and "Cache Granules" denote snapshot storage (see 0060). When a request to write data F into data block 3 of the Volume Granules is received at time 7, it is to replace data C. Data C is copied from block 3 of Volume granules into data block 3 of the Cache Granules as a snapshot at time 8, and data F is written into Volume Granules at time 9. The first snapshot is taken from times 5-10.]
 - indexing the snapshot by associating respective information with the snapshot (Fig. 34) [0133];
 - copying the indexed snapshot to a secondary volume (244 of Fig. 2) [0052, lines 4-end, where 244 is described as a cache that holds "snapshot caches," so the cache 244 acts as a secondary volume] [0062, lines 3-6; see above explanation of how data C is copied into data block 3 of the Cache Granules from data block 3 of the Volume Granules], and
 - repeating the taking, indexing, and copying steps for a plurality of snapshots (at times 5, 11 and 18 of Fig. 3) [0057, lines 12-end] [0062, lines 7-17].

10. **With respect to claim 2**, Welsh et al. disclose the method as recited in claim 1 (see above paragraph 9), further comprising displaying the snapshots to the user (Fig. 19) [0126].

11. **With respect to claim 3**, Welsh et al. disclose the method as recited in claim 2 (see above paragraph 10), wherein the displaying further includes displaying at least one of *a respective date of creation of each snapshot*, a respective persistence of each snapshot, and *a respective location of each snapshot* (Figs. 19, 21 and 38) [0126] [0150]

12. **With respect to claim 4**, Welsh et al. disclose the method as recited in claim 2 (see above paragraph 10), wherein the displaying includes displaying the snapshots to the user in a hierarchical format (Figs. 19 and 40-42) [0150].

13. **With respect to claim 7**, Welsh et al. disclose the method as recited in claim 4 (see above paragraph 12), further comprising: enabling the user to select a least one of the snapshots for restoration; and restoring the at least one snapshot selected by the user (Fig. 24) [0127].

14. **With respect to claim 8**, Welsh et al. disclose the method as recited in claim 2 (see above paragraph 10), further comprising enabling the user to delete a selected one of the snapshots (Fig. 22) [0126].

15. **With respect to claim 10**, Welsh et al. disclose a computer-executable code for managing stored data in a storage management system,

- the storage management system (Fig. 2) including
 - a storage manager (220 of Fig. 2) [0052, lines 2-5] [0053, lines 10-end],
 - a media agent (212 of Fig. 2) [0053, lines 1-2] connected to the storage manager (connection between 212 and 220 of Fig. 2), and
 - a primary volume (242 of Fig. 2) [0052, lines 4-end] connected to the media agent (indirect connection from 242 through 220 to 212),

- the code enabling the steps of [0055-0077]:
 - taking a snapshot of the primary volume (at times 5-10 of Fig. 3) [0062, lines 3-6, where "Volume Granules" denote primary volume storage (see 0059) and "Cache Granules" denote snapshot storage (see 0060). When a request to write data F into data block 3 of the Volume Granules is received at time 7, it is to replace data C. Data C is copied from block 3 of Volume granules into data block 3 of the Cache Granules as a snapshot at time 8, and data F is written into Volume Granules at time 9. The first snapshot is taken from times 5-10.]
 - indexing the snapshot by associating respective information with the snapshot (Fig. 34) [0133];
 - copying the indexed snapshot to a secondary volume (244 of Fig. 2) [0052, lines 4-end, where 244 is described as a cache that holds "snapshot caches," so the cache 244 acts as a secondary volume] [0062, lines 3-6; see above explanation of how data C is copied into data block 3 of the Cache Granules from data block 3 of the Volume Granules], and repeating the taking, indexing, and copying steps for a plurality of snapshots (at times 5, 11 and 18 of Fig. 3) [0057, lines 12-end] [0062, lines 7-17].

16. **With respect to claim 14**, Welsh et al. disclose a method for periodically copying changing data on a primary volume, the method comprising:

- capturing a first snapshot of data in a primary volume, the first snapshot being a block level copy of the data in the primary volume (970 of Fig. 9) [0009 describes

how "the snapshot may be implemented... at the storage system block level"]

[0106, lines 8-11];

- storing the first snapshot (970 of Fig. 9) [0106, lines 7-10];
- monitoring for a change in any one of the blocks stored in the first snapshot (1110 of Fig. 11) [0114, lines 1-2];
- storing a copy of a particular block when the monitoring determines that there was a change in the particular block from the first snapshot (1125 of Fig. 11) [0115, lines 4-end].

17. **With respect to claim 15**, Welsh et al. disclose the method as recited in claim 14 (see above paragraph 16), further comprising: producing a copy of the primary volume using the first snapshot and any copies of blocks that changed after the first snapshot, after at least one block has changed since the first snapshot [0148, lines 1-7; during restoration of the system to a previous state, snapshot data from the snapshot cache is copied into its old locations in the primary volume].

18. **With respect to claim 16**, Welsh et al. disclose a copy of a primary volume produced by the steps of:

- capturing a first snapshot of data in a primary volume, the first snapshot being a block level copy of the data in the primary volume (970 of Fig. 9) [0009 describes how "the snapshot may be implemented... at the storage system block level"] [0106, lines 8-11];
- storing the first snapshot (970 of Fig. 9) [0106, lines 7-10];
- monitoring for a change in any one of the blocks stored in the first snapshot (1110 of Fig. 11) [0114, line 1-2];

- storing a copy of a particular block when the monitoring determines that there was a change in the particular block from the first snapshot (1125 of Fig. 11) [0115, lines 4-end];
- and producing a copy of the primary volume using the first snapshot and any copies of blocks that changed after the first snapshot, after at least one block has changed since the first snapshot [0148, lines 1-7; during restoration of the system to a previous state, snapshot data from the snapshot cache is copied into its old locations in the primary volume].

19. **With respect to claim 17**, Welsh et al. disclose a method of managing stored data in a storage management system, the method comprising taking a snapshot of the primary volume;

- the storage management system (Fig. 2) including
 - a storage manager (220 of Fig. 2) [0052, lines 2-5] [0053, lines 10-end],
 - a media agent (212 of Fig. 2) [0053, lines 1-2] connected to the storage manager (connection between 212 and 220 of Fig. 2), and
 - a primary volume (242 of Fig. 2) [0052, lines 4-end] connected to the media agent (indirect connection from 242 through 220 to 212),
- the method comprising [0055-0077]:
 - taking a snapshot of the primary volume (at times 5-10 of Fig. 3) [0062, lines 3-6, where “Volume Granules” denote primary volume storage (see 0059) and “Cache Granules” denote snapshot storage (see 0060). When a request to write data F into data block 3 of the Volume Granules is received at time 7, it is to replace data C. Data C is copied from block 3 of

Volume granules into data block 3 of the Cache Granules as a snapshot at time 8, and data F is written into Volume Granules at time 9. The first snapshot is taken from times 5-10.]

- o identifying characteristics associated with the snapshot (Fig. 19) [0133]; and
 - o storing the characteristics in an index (Fig. 34) [0133];
20. **Claims 1-4, 7-8, 10 and 17** are rejected under 35 U.S.C. 102(b) as being anticipated by Dunphy et al. (US 5,638,509).
21. **With respect to claim 1**, Dunphy et al. disclose a method of managing stored data in a storage management system,
- the storage management system (Fig. 1) including
 - o a storage manager (16 of Fig. 1; column 6, lines 41-46),
 - o a media agent (11 of Fig. 1; column 1, lines 38-56) connected to the storage manager (11 connected to 16 indirectly through 14 of Fig. 1), and
 - o a primary volume (9 of Fig. 1; column 1, lines 36-38) connected to the media agent (9 connected to 11 indirectly through 19 of Fig. 1),
 - the method comprising:
 - o taking a snapshot of the primary volume (column 2, lines 9-11);
 - o indexing the snapshot by associating respective information with the snapshot (column 1, lines 61-65; column 2, lines 9-11; column 4, lines 25-39);
 - o copying the indexed snapshot to a secondary volume (column 2, lines 9-11), and

- repeating the taking, indexing, and copying steps for a plurality of snapshots (column 2, lines 15-25).
22. **With respect to claim 2**, Dunphy et al. disclose the method as recited in claim 1 (see above paragraph 21), further comprising displaying the snapshots to the user (Fig. 4; column 8, lines 34-61).
23. **With respect to claim 3**, Dunphy et al. disclose the method as recited in claim 2 (see above paragraph 22), wherein the displaying further includes displaying at least one of *a respective date of creation of each snapshot*, a respective persistence of each snapshot, and *a respective location of each snapshot* (Fig. 4; column 4, lines 32-36).
24. **With respect to claim 4**, Dunphy et al. disclose the method as recited in claim 2 (see above paragraph 22) wherein the displaying includes displaying the snapshots to the user in a hierarchical format (column 8, lines 39-61).
25. **With respect to claim 7**, Dunphy et al. disclose the method as recited in claim 4 (see above paragraph 24), further comprising: enabling the user to select a least one of the snapshots for restoration; and restoring the at least one snapshot selected by the user (44 of Fig. 4; 52 of Fig. 5; column 8, lines 62-64).
26. **With respect to claim 8**, Dunphy et al. disclose the method as recited in claim 2 (see above paragraph 22), further comprising enabling the user delete a selected one of the snapshots (43 of Fig. 4; column 8, lines 52-61).
27. **With respect to claim 10**, Dunphy et al. disclose a computer-executable code for managing stored data in a storage management system,
- the storage management system (Fig. 1) including
 - a storage manager (16 of Fig. 1; column 6, lines 41-46),

- a media agent (11 of Fig. 1; column 1, lines 38-56) connected to the storage manager (11 connected to 16 indirectly through 14 of Fig. 1), and
- a primary volume (9 of Fig. 1; column 1, lines 36-38) connected to the media agent (9 connected to 11 indirectly through 19 of Fig. 1),
- the code enabling the steps of:
 - taking a snapshot of the primary volume (column 2, lines 9-11);
 - indexing the snapshot by associating respective information with the snapshot (column 1, lines 61-65; column 2, lines 9-11; column 4, lines 25-39);
 - copying the indexed snapshot to a secondary volume (column 2, lines 9-11), and repeating the taking, indexing, and copying steps for a plurality of snapshots (column 2, lines 15-25).

28. **With respect to claim 17,** Dunphy et al. disclose a method of managing stored data in a storage management system, the method comprising taking a snapshot of the primary volume;

- the storage management system (Fig. 1) including
 - a storage manager (16 of Fig. 1; column 6, lines 41-46),
 - a media agent (11 of Fig. 1; column 1, lines 38-56) connected to the storage manager (11 connected to 16 indirectly through 14 of Fig. 1), and
 - a primary volume (9 of Fig. 1; column 1, lines 36-38) connected to the media agent (9 connected to 11 indirectly through 19 of Fig. 1),
- the method comprising:
 - taking a snapshot of the primary volume (column 2, lines 9-11);

- identifying characteristics associated with the snapshot and storing the characteristics in an index (column 1, lines 61-65; column 2, lines 9-11; column 4, lines 25-39).

Claim Rejections - 35 USC § 103

29. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

30. **Claims 5-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Welsh et al. (US 2004/0117572) in view of De Meno et al. (US 6,721,767).

31. **With respect to claim 5**, Welsh et al. disclose the method as recited in claim 1 (see above paragraph 9). Welsh et al. do not disclose expressly the limitation further comprising associating each respective snapshot with a corresponding application.

However, De Meno et al. disclose the limitation further comprising associating each respective snapshot with a corresponding application (column 1, lines 53-57).

Welsh et al. and De Meno et al. are analogous art because they are from the same field of endeavor, namely incremental data backup.

At the time of invention it would have been obvious to a person of ordinary skill in the art to apply the application-specific snapshot method of De Meno et al. to the snapshot backup system of Welsh et al. The motivation for doing so would have been to provide "access to a specific version of the application specific data when requested

by a user such that the application specific data from a user selected date is accessible" (column 1, lines 64-67).

Therefore, it would have been obvious to combine De Meno et al. with Welsh et al. for the benefit of a snapshot storage system that can take snapshots of specific application data to obtain the invention as specified in claim 5.

32. **With respect to claim 6,** Welsh et al. in view of De Meno et al. disclose the method as recited in claim 5 (see above paragraph 31). Welsh et al. do not disclose expressly the limitation further comprising displaying to a user a respective one of the snapshots in a screen corresponding to the respective application.

However, De Meno et al. disclose the limitation further displaying to a user a respective one of the snapshots in a screen corresponding to the respective application (Fig. 4).

Welsh et al. and De Meno et al. are analogous art because they are from the same field of endeavor, namely incremental data backup.

At the time of invention it would have been obvious to a person of ordinary skill in the art to combine the snapshots of data in a particular application and their display screen of De Meno et al. with the snapshot storage mechanism of Welsh et al. The motivation for doing so would have been to "call the method by which a trigger variable/expression and associated execution snapshots could be presented to the user and a corresponding process execution state can be restored" [0042].

Therefore, it would have been obvious to combine De Meno et al. with Welsh et al. for the benefit of a user interface that displays the snapshots of data for a particular application to obtain the invention as specified in claim 6.

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33. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Welsh et al. (US 2004/0117572) in view of Midgely et al. (US 5,604,862).

34. **With respect to claim 9**, Welsh et al. disclose the method as recited in claim 1 (see above paragraph 9). Welsh et al. do not expressly disclose the limitation further comprising deleting a snapshot after a defined period of time.

However, Midgely et al. disclose the limitation further comprising deleting a snapshot after a defined period of time (column 7, lines 11-17).

Welsh et al. and Midgely et al. are analogous art because they are both from the same field of endeavor, namely snapshot data storage.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the periodic deletion of snapshots of Midgely et al. with the snapshot storage system of Welsh et al. The motivation for doing so would have been to clear space on the disk cache for new snapshots when the cache is nearly full (column 7, lines 14-15).

Therefore, it would have been obvious to combine Midgely et al. with Welsh et al. for the benefit of a snapshot storage system that automatically deletes older snapshots when the snapshot memory is nearly full.

35. **Claims 11-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 6,021,475) in view of Welsh et al. (US 2004/0117572).

36. **With respect to claim 11**, Nguyen et al. disclose a method for replacing data in a primary volume stored at a first device ('72'x, column 7, lines 41-43) associated with a first logical unit number with data in a recovery volume ('63'x, column 7, lines 41-43)

stored at a second device associated with a second logical unit number, the method comprising:

- updating a memory (DEF_DEV_ADDR, column 7, line 37) to indicate that the primary volume is no longer associated with the first logical unit number (column 7, lines 43-48; column 8, lines 15-33);
- updating the memory to indicate that the recovery volume is no longer associated with the second logical unit number (column 7, lines 43-45; column 8, lines 15-33);
- and updating the memory to indicate that the recovery volume is associated with the first logical unit number (column 7, lines 43-45; column 8, lines 15-33).

Nguyen et al. do not disclose expressly the limitation wherein the recovery volume includes a plurality of snapshots of the primary volume.

However, Welsh et al. disclose the limitation wherein the recovery volume includes a plurality of snapshots of the primary volume [0009, lines 9-12].

Nguyen et al. and Welsh et al. are analogous art because they are from the same field of endeavor, namely data storage and recovery.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the drive address swap system of Nguyen with the snapshot storage system of Welsh et al. The motivation for doing so would have been “because a backup medium separate and apart from a primary storage medium is not required, and the snapshot data is stored online and, thus, readily accessible” [0010, lines 2-4].

Therefore, it would have been obvious to combine Welsh et al. with Nguyen et al. for the benefit of a drive address swap system that uses the snapshot storage to obtain the invention as specified in claim 11.

37. **With respect to claim 12**, Nguyen et al. in view of Welsh et al. disclose the method as recited in claim 11 (see above paragraph 36). Nguyen et al. disclose the further limitation wherein metadata associated with primary volume is maintained in association with the first logical unit number (column 8, lines 15-33).

38. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 6,021,475) in view of Welsh et al. (US 2004/0117572) as applied to claims 11 and 12 above, and further in view of LeCrone et al. (US 6,631,477).

39. **With respect to claim 13**, Nguyen et al. in view of Welsh et al. disclose the method as recited in claim 11 (see above paragraph 36). Nguyen et al. in view of Welsh et al. do not disclose expressly the limitation where input and output to both the recovery and primary volumes is suspended during the updating steps.

However, LeCrone et al. disclose the limitation where input and output to both the recovery and primary volumes is suspended during the updating steps (column 9, lines 62-66).

Nguyen et al., Welsh et al. and LeCrone et al. are analogous art because they are from the same field of endeavor, namely data storage and recovery.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to suspend input and output to and from the primary and recovery volumes of the snapshot data storage system. The motivation for doing so would have been

because the volumes could not service the requests when their logical addresses were being changed.

Therefore, it would have been obvious to combine LeCrone et al. with Nguyen et al. and Welsh et al. for the benefit of a suspension of data input and output during the time when the logical addresses are swapped to obtain the invention as specified in claim 13.

40. **Claims 5-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunphy et al. (US 5,638,509) in view of De Meno et al. (US 6,721,767).

41. **With respect to claim 5**, Dunphy et al. disclose the method as recited in claim 1 (see above paragraph 21). Dunphy et al. do not disclose expressly the limitation further comprising associating each respective snapshot with a corresponding application.

However, De Meno et al. disclose the limitation further comprising associating each respective snapshot with a corresponding application (column 1, lines 53-57).

Dunphy et al. and De Meno et al. are analogous art because they are from the same field of endeavor, namely incremental data backup.

At the time of invention it would have been obvious to a person of ordinary skill in the art to apply the application-specific snapshot method of De Meno et al. to the snapshot backup system of Dunphy et al. The motivation for doing so would have been to provide "access to a specific version of the application specific data when requested by a user such that the application specific data from a user selected date is accessible" (column 1, lines 64-67) in order to maintain data coherency and integrity.

Therefore, it would have been obvious to combine De Meno et al. with Dunphy et al. for the benefit of a snapshot storage system that can take snapshots of specific application data to obtain the invention as specified in claim 5.

42. With respect to claim 6, Dunphy et al. in view of De Meno et al. disclose the method as recited in claim 5 (see above paragraph 41). Dunphy et al. do not disclose expressly the limitation further comprising displaying to a user a respective one of the snapshots in a screen corresponding to the respective application.

However, De Meno et al. disclose the limitation further displaying to a user a respective one of the snapshots in a screen corresponding to the respective application (Fig. 4).

Dunphy et al. and De Meno et al. are analogous art because they are from the same field of endeavor, namely incremental data backup.

At the time of invention it would have been obvious to a person of ordinary skill in the art to combine the snapshots of data in a particular application and their display screen of De Meno et al. with the snapshot storage mechanism of Dunphy et al. The motivation for doing so would have been to “call the method by which a trigger variable/expression and associated execution snapshots could be presented to the user and a corresponding process execution state can be restored” [0042].

Therefore, it would have been obvious to combine De Meno et al. with Dunphy et al. for the benefit of a user interface that displays the snapshots of data for a particular application to obtain the invention as specified in claim 6.

43. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable Dunphy et al. (US 5,638,509) in view of Midgely et al. (US 5,604,862).

44. **With respect to claim 9**, Dunphy et al. both disclose the method as recited in claim 1 (see above paragraph 22). Dunphy et al. do not expressly disclose the limitation further comprising deleting a snapshot after a defined period of time.

However, Midgely et al. disclose the limitation further comprising deleting a snapshot after a defined period of time (column 7, lines 11-17).

Dunphy et al. and Midgely et al. are analogous art because they are both from the same field of endeavor, namely snapshot data storage.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the periodic deletion of snapshots of Midgely et al. with the snapshot storage system of Welsh et al. or Dunphy et al. The motivation for doing so would have been to clear space on the disk cache for new snapshots when the cache is nearly full (column 7, lines 14-15).

Therefore, it would have been obvious to combine Midgely et al. with Dunphy et al. for the benefit of a snapshot storage system that automatically deletes older snapshots when the snapshot memory is nearly full.

45. **Claims 11-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 6,021,475) in view of Dunphy et al. (US 5,638,509).

46. **With respect to claim 11**, Nguyen et al. disclose a method for replacing data in a primary volume stored at a first device ('72'x, column 7, lines 41-43) associated with a first logical unit number with data in a recovery volume ('63'x, column 7, lines 41-43) stored at a second device associated with a second logical unit number, the method comprising:

- updating a memory (DEF_DEV_ADDR, column 7, line 37) to indicate that the primary volume is no longer associated with the first logical unit number (column 7, lines 43-48; column 8, lines 15-33);
- updating the memory to indicate that the recovery volume is no longer associated with the second logical unit number (column 7, lines 43-45; column 8, lines 15-33);
- and updating the memory to indicate that the recovery volume is associated with the first logical unit number (column 7, lines 43-45; column 8, lines 15-33).

Nguyen et al. do not disclose expressly the limitation wherein the recovery volume includes a plurality of snapshots of the primary volume.

However, Dunphy et al. disclose the limitation wherein the recovery volume includes a plurality of snapshots of the primary volume (column 2, lines 9-15).

Nguyen et al. and Dunphy et al. are analogous art because they are from the same field of endeavor, namely data storage and recovery.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the drive address swap system of Nguyen with the snapshot storage system of Dunphy et al. The motivation for doing so would have been "to enable the system to later locate and retrieve a single lost data file or to recreate the state of a selected data file or the computer system at a selected point in time" (column 2, lines 11-15).

Therefore, it would have been obvious to combine Dunphy et al. with Nguyen et al. for the benefit of a drive address swap system that uses the snapshot storage to obtain the invention as specified in claim 11.

47. **With respect to claim 12**, Nguyen et al. in view of Dunphy et al. disclose the method as recited in claim 11 (see above paragraph 46). Nguyen et al. disclose the further limitation wherein metadata associated with primary volume is maintained in association with the first logical unit number (column 8, lines 15-33).

48. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (US 6,021,475) in view of Dunphy et al. (US 5,638,509) as applied to claims 11 and 12 above, and further in view of LeCrone et al. (US 6,631,477).

49. **With respect to claim 13**, Nguyen et al. in view of Dunphy et al. (US 5,638,509) disclose the method as recited in claim 11 (see above paragraph 46). Nguyen et al. in view of Welsh et al. do not disclose expressly the limitation where input and output to both the recovery and primary volumes is suspended during the updating steps.

However, LeCrone et al. disclose the limitation where input and output to both the recovery and primary volumes is suspended during the updating steps (column 9, lines 62-66).

Nguyen et al., Dunphy et al. and LeCrone et al. are analogous art because they are from the same field of endeavor, namely data storage and recovery.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to suspend input and output to and from the primary and recovery volumes of the snapshot data storage system. The motivation for doing so would have been because the volumes could not service the requests when their logical addresses were being changed.

Therefore, it would have been obvious to combine LeCrone et al. with Nguyen et al. and Dunphy et al. for the benefit of a suspension of data input and output during the

time when the logical addresses are swapped to obtain the invention as specified in claim 13.

Conclusion

50. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US 2002/0174416 discloses a snapshot system for variables within an application.
- US 6,311,193 discloses a snapshot management system.

51. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James R. Golden whose telephone number is 571-272-5628. The examiner can normally be reached on Monday-Friday, 8:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571-272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 2187

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